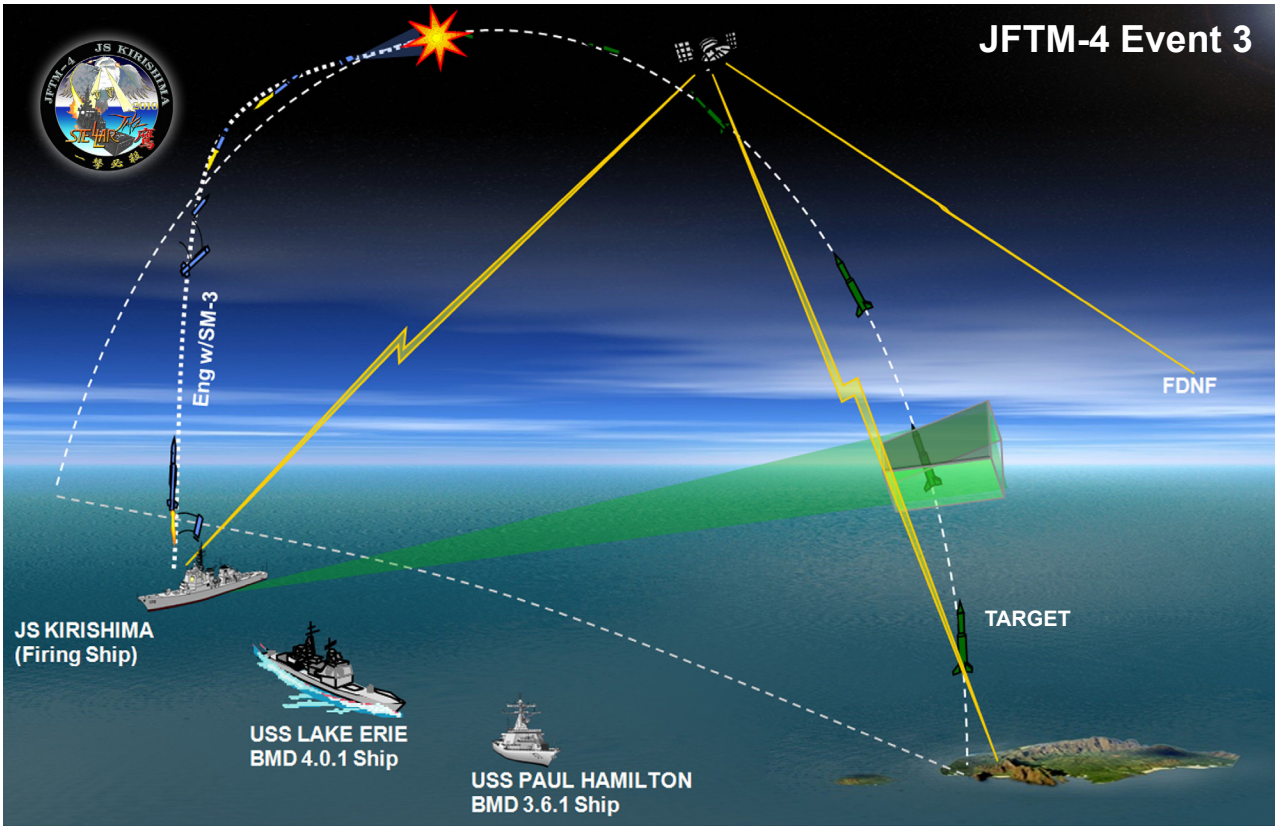
JAPAN FLIGHT TEST MISSION - 4
FACT SHEET



Aegis Ballistic Missile Defense (BMD) engagement capability against theater / regional ballistic missile threats has been under the Combatant Commanders' operational control since late 2004. This essential capability provides the United States with a mobile, global, deployable and proven Ballistic Missile Defense System (BMDS) that can destroy ballistic missiles above the atmosphere with the Standard Missile-3 (SM-3).

The Japan Maritime Self Defense Force (JMSDF) has two flights of Aegis configured destroyers, their *KONGO* Class and *ATAGO* Class. The Government of Japan decided to add BMD capability to their four *KONGO* Class destroyers. Each installation is followed by a flight test to demonstrate the proper operation of the BMD equipment, computer programs and certify crew readiness.

In Japan's first BMD at sea firing named Japan Flight Test Mission (JFTM)-1, the *JS KONGO* (DDG 173) successfully searched for, detected, tracked, engaged and intercepted a separating Medium Range Ballistic Missile Target (MRT) in December 2007. JFTM-1 validated the proper performance of the Japan Aegis BMD Combat System configuration. *JS KONGO's* at sea firing was followed by *JS CHOKAI* (DDG 176) and *JS MYOKO* (DDG 175). *JS KIRISHIMA* (DDG 174) is the last *KONGO* Class Destroyer to have the BMD capability installed and tested.

JS KIRISHIMA has a place in U.S. ballistic missile defense history. In June 2006, *JS KIRISHIMA* became the first JMSDF ship to participate in a Navy/Aegis BMD flight mission, Flight Test Mission-10, where she successfully tracked a separating ballistic missile target.

JFTM-4 Events 1, 2 and 3

As in all Aegis BMD tests, JFTM-4 is conducted as a "campaign" where several events are conducted to gather system information. Event 1 is a tracking exercise with the primary objective of demonstrating the Japan Aegis BMD Combat System in conducting a no-notice simulated SM-3 engagement of a separating ballistic missile target. *USS PAUL HAMILTON* (DDG 60), configured with the operational BMD 3.6.1 Weapon System, is stationed up-range of the target launch site. The target launch time is not revealed to any of the participants. *PAUL HAMILTON* acquires, tracks and reports all ballistic missile targets. *JS KIRISHIMA*, stationed down-range of the launch site, acquires, tracks and conducts a simulated SM-3 Block IA engagement of the target.

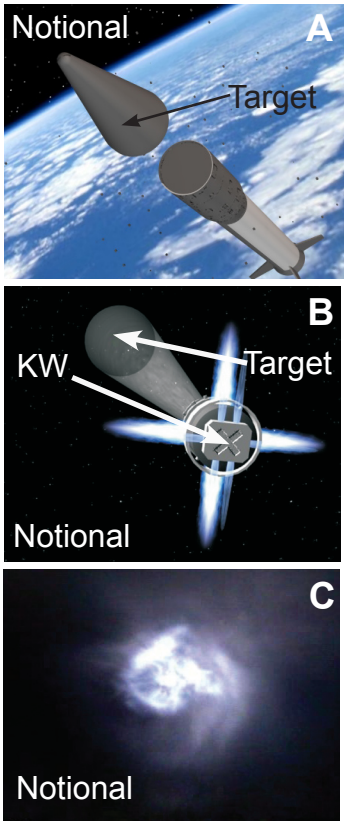
Also participating in JFTM-4 is *USS LAKE ERIE* (CG 70), testing the second generation Aegis BMD Weapon System, Aegis BMD 4.0.1. For *LAKE ERIE,* Event 1 is an at-sea tracking opportunity to demonstrate the enhanced discrimination capability of the Aegis BMD signal processor.

Event 2 is conducted on the same day as Event 1. With no U.S. ships directly participating, *JS KIRISHIMA* conducts a no-notice simulated SM-3 engagement.

The objective of Event 3 is to verify *JS KIRISHIMA*'s engagement capability of the recently upgraded Japanese Destroyer. JFTM-4 demonstrates the Japan Aegis BMD Combat System configuration and SM-3 Block IA missile performance in the lethal intercept of a separating MRT, where the target warhead or Reentry Vehicle (RV) separates from its booster rocket. As the firing ship, the *JS KIRISHIMA*

is the main participant in this test, with both U.S. ships using this event as a tracking exercise.

To make the test scenario more operationally realistic, the launch of the MRT is not revealed to any of the participants. *JS KIRISHIMA*'s crew uses on-board planning aids to determine optimum ship patrol area and recommended search sectors for their SPY-1 radar.



Test Conduct

JFTM-4 begins when the MRT is launched from the Pacific Missile Range Facility. The Aegis ships' SPY-1 radars search for and detect the MRT as it breaks the horizon. Aboard *JS KIRISHIMA*, the Aegis BMD Weapon System acquires the target, tracks and transmits the track data to other participating ships and U.S. Forward Deployed Naval Forces (FDNF) in the Western Pacific. At the same time, the weapon system computes the fire control solution for intercepting the target. After MRT rocket motor burnout, the RV is ejected (inset A). *JS KIRISHIMA*'s SPY-1 radar tracks the target complex. Shortly after the MRT is declared engageable by the weapon system, *JS KIRISHIMA*'s crew fires a SM-3 Block IA missile. The SPY-1 radar acquires and tracks both the SM-3 and the target throughout the remainder of their flights.

After SM-3 booster burnout and during second stage rocket motor operation, the weapon system continuously uplinks guidance commands to the missile. The second stage separates after Dual Thrust Rocket Motor burnout. The Third Stage Rocket Motor (TSRM) fires its first pulse to provide axial thrust required to maintain the missile's trajectory. The TSRM's Attitude Control System performs a pitch maneuver to eject the nosecone and expose the Kinetic Warhead's (KW's) Infra-Red (IR) seeker and then re-aims the missile towards the target. The TSRM then executes a second pulse burn.

The weapon system uplinks track information to the missile, providing object track data. With uplinked guidance commands, the weapon system positions the KW so that the target is in the center of the IR seeker's field of view. After ejection of the KW from the missile, the KW's Solid Divert and Attitude Control System fires to maintain the necessary heading for intercept (inset B). The KW correlates its infrared tracks to those previously received from the weapon system to discriminate the RV from other objects.

Upon acquiring the RV, the KW performs divert maneuvers as required to place itself on a collision course with the RV. Additional refinement of the intercept calculations are made by the KW and final intercept divert maneuvers are executed. The KW impacts the RV, destroying it with lethal force (inset C).

Risk Reduction

The MDA frequently leverages testing events for risk reduction opportunities. On a not to interfere basis, *USS LAKE ERIE* participates in each JFTM-4 event to detect and track the ballistic missile targets with the second generation Aegis BMD Weapon System, BMD 4.0.1. These tracking events are at-sea opportunities to exercise the functionalities of this developmental weapon system. Ballistic missile targets are tracked to exercise the discrimination capability of the radar's new signal processor. Simulated engagements are conducted with the performance characteristics of the improved SM-3 Block IB missile. This next generation Aegis BMD Weapon System will be able to engage increasingly longer range, more sophisticated ballistic missiles in larger raid sizes.

JS KIRISHIMA (DDG 174)